REMARKS

Applicants have thoroughly considered the Examiner's remarks and have amended the application to more clearly set forth the invention. Claims 25-28, 31-34, 37-40, 43-46, 49, 52, 55, 56, 58, 61, 62 and 64 have been amended by this Amendment A and are presented for further consideration. Applicants respectfully request allowance of claims 25-66 in view of the amendments and the following remarks is respectfully requested.

Section 102(b) Rejections

Claims 25, 27-29, 37, 38, 40, 41, 43, 44, 46, 47, 49, 51, 53, 61, 62, 64, and 65 stand rejected as being anticipated by U.S. Patent No. 4,401,035 to Spigarelli et al. The Examiner states that Spigarelli discloses a control system as recited by the claims. In particular, the Examiner asserts that Spigarelli discloses that power operating modes of each locomotive in a consist are varied in accordance with predetermined parameters to minimize fuel consumption.

Applicants acknowledge that Spigarelli discloses a locomotive control system for controlling locomotives in a consist as a function of fuel efficiency. To accomplish this, Spigarelli discloses independently controlling the throttle setting of the locomotive within a consist in a full throttle, a half throttle, or an idle setting to improve fuel efficiency ***while maintaining a set speed.*** However, the Examiner is incorrect in concluding that Spigarelli teaches each and every aspect of claims 25, 27-29, 37, 38, 40, 41, 43, 44, 46, 47, 49, 51, 53, 61, 62, 64, and 65.

Spigarelli discloses a control device for controlling a locomotive system such that individual locomotives in a consist can be operated in a fuel save mode to improve fuel efficiency while maintaining a set speed. In particular, Spigarelli discloses a control device which selectively reduces the throttle settings of an individual locomotive in a consist while maintaining the consist at or near the set speed, as determined from a lead locomotive (see column 8, lines 9-16), by selectively placing one or more of trail locomotive units in a consist at a one half power setting (fuel save one condition) or at a No. 1 throttle setting which is essentially an idle position (fuel save two condition).

In contrast, the present invention discloses that ***several features regarding the operating parameters*** of the consist may be taken into account in determining the particular

notch positions of the various locomotives of the consist. In other words, more than one operating parameter (e.g., speed) of the consist may be optimized according to the invention. For example, suppose that a consist of four locomotives is spread throughout a mile long train so that at some point in the trip some of the locomotives are traveling uphill while others are traveling downhill. If acceleration, coasting, or braking is required at that point, the present invention can vary the power modes of operation of each of the locomotives of the consist as a function of operating parameters other than speed to achieve a desired, optimal result. See Application page 13, lines 22-31. For instance, in the case of braking, the power modes are varied as a function of the braking capacity of each of the locomotives in the consist.

To this end, amended claim 25recites, in part, "the power operating mode of the second locomotive is different as compared to the power operating mode of the first locomotive,.. wherein [ ] first control information and [] second control information specifies the power operating mode of each of the first and second locomotives, respectively, as a function of the braking capacity of the first and second locomotives." Similarly, amended claim 49 recites, in part, the power operating mode of the second locomotive is different as compared to the power operating mode of the first locomotive,..wherein [a] first controller and [a] second controller specifies the power operating mode of each of the first and second locomotives, respectively, as a function of the braking capacity of the first and second locomotives." The Examiner asserts that the system of Spigarelli is inherently capable of selecting the power operating mode to optimize the braking of the first and second locomotives. In support of this contention, the Examiner directs applicants to column 16, lines 42-44 of Spigarelli where it states that "the acceleration and deceleration of the consist are taken into account in determining the power setting of the locomotive units." The Examiner contends that deceleration of the consist is a part of braking. However, the deceleration disclosed by Spigarelli does not correspond to braking capacity as claimed by applicants, but rather refers to a calculated parameter used to anticipate a future speed of the consist and to determine whether power to a particular locomotive can be increased or decreased while maintaining the consist at or near a desired speed.

With respect to deceleration, (i.e., negative acceleration: see column 29, line 23-25), Spigarelli discloses "it is a function of the speed control logic to compare the actual speed of the train against the speed setting dialed in by the operator and to consider the speed and acceleration of the system in determining whether to add or subtract from the power setting of

the total consist. When the train is below the speed setting, for example, it is not necessary to add more power if the train as a whole is accelerating and in fact if the train is approaching the set speed at a relatively high acceleration, it is highly possible that the train speed will overshoot the speed setting and actually reach a speed considerably in excess of the setting before the power is reduced enough that the consist comes back down to the set speed. Therefore, it is one of the functions of the speed control logic to anticipate the changes of the train in speed and change the total power setting accordingly." Spigarelli, column 27, line 62-65. Considering deceleration to determine whether a power reduction can be made while maintaining a set speed as disclosed Spigarelli is not the same as specifying different power operating modes of each of the first and second locomotives as a function of the braking capacity of the first and second locomotives as claimed in the present application.

Moreover, Spigarelli teaches away from a power operating mode being selected to optimize the braking of the first and second locomotive. Spigarelli discloses "[t]he condition of the dynamic brake of the locomotive is similarly applied as an input to the microprocessor since it is not desirable to operate the locomotive consist in the fuel save mode if the dynamic brake is on." Column 5, lines 59-64. In other words, according to Spigarelli, it is not desirable to vary the power operating modes of the locomotives during braking. As such, Spigarelli fails to teach or suggest specifying the power operating mode of each of the first and second locomotives as a function of the braking capacity of the first and second locomotives. Thus, amended claims 25 and 49 are allowable over the cited art.

The present invention further discloses it is contemplated that the ACM processing module may develop a unique profile for its associated locomotive and that the profile would be used to determine locomotive operation in combination with the profiles of the other locomotives of the consist. For example, the profile may be dynamic in the sense that the ACM processing module may adjust or modify the profile according to the time of year or age of the locomotive or other variables. Amended claim 37 recites, in part, the power operating mode of the second locomotive is different as compared to the power operating mode of the first locomotive, ... wherein [ ] first control information and [] second control information specifies the power operating mode of each of the first and second locomotives as a function of the performance profiles for the first and second locomotives to optimize the performance parameter. Claim 55 recites, in part, wherein [a] first controller and [a] second controller specifies the power operating mode of each of the first and second locomotives as a function

of the performance profiles for the first and second locomotives to optimize the performance parameter. Spigarelli fails to teach or suggest specifying a power operating mode of individual locomotives as a function of performance profiles as claimed and described in the present application. Accordingly, amended claims 43 and 61 are allowable over the cited art.

Referring now to claim 43, the Examiner contends that the power operating mode of the rear locomotive is preferred to be reduced before other locomotive units towards the front, and, therefore, when a crew member is riding in the rear locomotive that is also in a power reduction mode, the claimed features of claim 43 are met. (See Office action at page 3.) Claim 43 has been amended to recite that "first control information and second control information specifies the power operating mode of each of the first and second locomotives, respectively, ***as a function of a location of the crew member*** such that the specified power operation mode of a locomotive in which a crew member is riding is less than a power operating mode of a locomotive in which a crew member is not riding." As the Examiner acknowledges, Spigarelli discloses that reduction in the power operating mode of the rear locomotive is preferred to be reduced before other locomotive units. As such, the power in the rear locomotive will be reduced whether or not a crew member is riding in the rear locomotive. Thus, specifying the power operating mode of a locomotive ***as a function of a location of a crew member*** is not disclosed or suggested by Spigarelli. Thus, amended claim 43 is allowable over the cited art.

As claims 25, 37, 43, 49, and 61 recite aspects not disclosed by Spigarelli, the Examiner should withdraw the rejections to claims 25, 37, 43, 49, and 61. Claims 27-29 depend from claim 25 and are allowable for at least the same reasons as claim 25. Claims 38, 40, and 41 depend from claim 37 and are allowable for at least the same reasons as claim 37. Claims 44, 46, and 47 depend from claim 43 and are allowable for at least the same reasons as claim 43. Claims 51-53 depend from claim 49 are allowable for at least the same reasons as claim 49. Claims 62, 64, and 65 depend from claim 61 are allowable for at least the same reasons as claim 61.

Section 103(a) Rejections

Claims 25-66 stand rejected as being unpatentable over U.S. Patent No. 5,969,643 issued to Curtis, in view of Spigarelli. The Examiner states that Curtis discloses a control

system for a locomotive consist similar to that recited by the instant claims. The Examiner contends that Curtis discloses that the locomotives are controlled from a lead locomotive through a radio communication control system, and a GPS link is provided to enhance the safety and efficiency of a power distribution system for controlling the tractive effort and braking capacity of a train. The Examiner concludes that Curtis does not disclose different operating modes. The Examiner contends that Nickles discloses a system for controlling a locomotive consist as discussed above. The Examiner concludes that in view of Spigarelli, it would have been obvious to modify the system of Curtis to include different power operating modes, in a manner similar to that taught by Spigarelli, so as to enhance the power efficiency of the system.

The Examiner's combination of Curtis with Spigarelli is inappropriate as there is no teaching within either Curtis or Spigarelli suggesting the desirability or motivation for combining Curtis with Spigarelli. Curtis discloses determining the relative position of a locomotive within a consist and/or a train and utilizing the determined relative position for train administration. While Curtis mentions that its geographic determinations are associated with a control system, contrary to the Examiner's contention, Curtis does not disclose a locomotive or consist control system. Rather Curtis discloses a list of uses for the determined relative position of each locomotive: verifying the configuration of locomotives (Curtis, column 4, lines 16-22), determining the speed and distance from other locomotives (Curtis, column 4, lines 23-27), comparing the speed and direction to confirm that all locomotives are part of the same train (Curtis, column 4, lines 27-32), determining locomotives that may have been omitted from the consist list (Curtis, column 4, lines 32-34), determining the distance between groups of locomotives (Curtis, column 4, lines 39-40), calculating the average position of each locomotive group (Curtis, column 4, lines 40-53), and comparing determined distances to expected distances to take action if the distances vary by a pre-determined variance (Curtis, column 4, lines 53-60). From this list, Curtis discloses determining a GPS location of locomotives in a consist and using the determined locations for purely administrative purposes, administering the composition of the train. Curtis does not disclose or suggest using the determined location for controlling an operation of the train or specifying a power operating mode of a locomotive.

Additionally, while Spigarelli discloses a control system for specifying the independent throttle settings of locomotives in a consist, Spigarelli discloses specifying the

throttle to either a half power setting or an idle setting to optimize the fuel efficiency while maintaining a set speed. Spigarelli does not disclose or suggest determining a position of a locomotive. Additionally, Spigarelli does not disclose or suggest specifying a throttle setting as a function of any factor other than speed. As Curtis does not suggest a motivation for using the determined position for controlling a locomotive and Spigarelli does not suggest a motivation for controlling the operation of a locomotive based on any factor other than speed, the combination of Curtis and Spigarelli is inappropriate. As such, the Examiner should withdraw the rejections to claims 26, 31-36, 39, 45, 50, 55-60, and 63 based on Curtis.

Furthermore, the Examiner's interpretations of Curtis are incorrect and therefore the combination of Curtis and Spigarelli fails to teach each and every aspect recited by claim 7. Amended claim 31 recites that one of the plurality of operating modes includes a position optimization mode. An operator indicates at the master control the desired position optimization mode. The first processing module of the first locomotive and the second processing module of the second locomotive are each responsive to the indicated position optimization mode. A GPS link indicates the position of the consist. The position optimization mode specifies the power operating mode of each of the first and second locomotives as a function of the position of the consist. These aspects of claim 31 are not disclosed by Curtis or Spigarelli, alone or in combination, and are not obvious in view of the combination of Curtis with Spigarelli.

By comparison, Curtis teaches an apparatus for determining the position of one or more locomotives in a train consist by using the GPS satellite system and GPS receivers located in each locomotive. Curtis teaches determining the relative positions of locomotives in the train or consist based on the received GPS information. Curtis utilizes the determined relative position information to assist in administering the configuration of locomotives within the train consist so that they may be tracked or verified as a railway train is reconfigured by adding and removing cars from the train. Curtis, Abstract and throughout. Curtis discloses a list of "administrative" uses for the determined relative position of each locomotive as identified above. In each of these identified uses, Curtis teaches that the relative position of the locomotives within the consist is used for administering the make up of the train and the consist.

Contrary to the contention of the Examiner, Curtis does not disclose a control system for a locomotive or utilizing position as a controlling factor and, as acknowledged by the

Examiner, does not disclose specifying different power operating modes of the first and second locomotives. As Curtis does not disclose or suggest specifying a throttle setting or power operating mode as a function of the determined GPS position as recited by claim 31, the Examiner should withdraw the rejection to claim 31. Claims 32-36 depend from claim 31 and are allowable due to their dependencies from claim 31. Additionally, claims 26, 39, 45, 50, 55-60, and 63 recite similar aspects and are each also allowable for the same reasons as claim 31.

Claims 28, 34, 40, 43, 52, 58, and 64 have been amended to recite specifying the power operating mode of each of the first and second locomotives as a function of a location of the crew member such that the specified power operation mode of a locomotive in which a crew member is riding is less than a power operating mode of a locomotive in which a crew member is not riding. Although Spigarelli discloses the throttle setting of rear locomotive is preferred to be reduced before other locomotive units toward the front, and it is accurate that a crew member could ride in a rear locomotive, specifying the power operating mode of a locomotive as a function of a location of a crew member is not disclosed or suggested by Curtis or Spigarelli, alone or in combination, and is not obvious in view of the combination of Curtis with Spigarelli. Thus, the Examiner should withdraw the rejections to claims 28, 34, 40, 43, 52, 58, and 64. Claims 44-48 depend from claim 43 and are allowable due to their dependencies from claim 43.

Additionally, each of claims 25-66 are also not obvious in view of Spigarelli as all of the recited aspects of claims 25-66 are not disclosed or suggested by Spigarelli. As discussed above, claims 25-66 recite that the first and second locomotives have a plurality of operating modes including at least one power operating mode and at least one of: a braking capacity optimization mode (claims 25-30, 32, 38, 44, 49-54, 56, and 62); a position optimization mode (claims 26, 31- 36, 39, 45, 50, 55-60, and 63); and a location of a crew member optimization mode (claims 28, 34, 40, 43-48, 52, 58, and 64). In contrast, Spigarelli discloses optimizing the operation of a consist for a single operating mode, e.g., fuel efficiency based on speed. The combination of Spigarelli or Curtis does not teach or disclose locomotives with a plurality of operating modes and does not disclose any of the four operating modes recited by the claims.

The aspects of the invention recited by the claims include specifying the power operating mode of each of the first and second locomotives as a function of braking capacity

(claims 25-30, 32, 38, 44, 49-54, 56, and 62), GPS determined position (claims 26, 31- 36, 39, 45, 50, 55-60, and 63), a performance profile (claims 27, 33, 37-42, 46, 51, 57, and 61-66), or a location of a crew member (claims 28, 34, 40, 43-48, 52, 58, and 64). In contrast, Spigarelli discloses specifying and controlling the throttle settings of individual locomotives within the consist as a function of a set speed to improve total power-to-fuel consumption, e.g., fuel efficiency. This is different than the current claims that recite specifying the power operating modes of the first and second locomotives as a function of four independent factors (braking capacity, GPS determined position, a performance profile, and a location of a crew member). Spigarelli does not disclose or suggest determining of the four factors or specifying the power operating mode of a locomotive based on any factor other than speed. Specifying the power operating mode of a locomotive as a function of braking capacity, GPS determined position, a performance profile, or a location of a crew member, is different than specifying the power operating mode as a function of speed as disclosed by Spigarelli.

As all of the aspects of claims 25-66 are not disclosed by and are not obvious in view of Curtis or Spigarelli, alone or in combination, the Examiner should withdraw the Section 103 rejections to claims 25-66. As such, Applicants believe that claims 25-66 are in condition for allowance.

Applicants believe the Examiner inadvertently referred to Nickles instead of Spigarelli in the second full paragraph on page 4 of the Office action. As the preceding paragraph and the following paragraph both discuss Spigarelli. As there are two U.S. Patents to Nickles: 4,582, 280 ('280) and 4,344,364 ('364) it is not clear which Nickles patent to which the Examiner is referring. Nevertheless, applicants have reviewed the both patents ('280 and '364') and find them no more relevant than the applied references.

The '280 patent discloses a radio control system for trains having a lead unit and one or more remote units or groups of remote control units in which the control functions of the one or more units or groups of remote units are controlled by radio commands from the lead unit. The '364 patent teaches that its "general object" is to control the operation of a consist or train to optimize fuel consumption for conserving fuel. Nickles, column 3, lines 9-12. To achieve this general object, '364 patent teaches that individual throttle settings of locomotives within a consist are specified by setting tolerances on total power and finding a combination of throttle settings that produce the desired total power output while yielding the best total

efficiency for the selected master locomotive throttle setting. (See Nickles '364, column 4, lines 8-18.)

In contrast, the current claims specify the power operating mode of each of the first and second locomotives as a function of braking capacity (claims 25-30, 32, 38, 44, 49-54, 56, and 62), GPS determined position of the consist (claims 26, 31- 36, 39, 45, 50, 55-60, and 63), performance profile (claims 27, 33, 37-42, 46, 51, 57, and 61-66), or location of a crew member (claims 28, 34, 40, 43-48, 52, 58, and 64). Each of the recited power operating modes specify the power operating mode independent of the output power, fuel consumption, and therefore independent of fuel efficiency. As such, controlling the throttle settings of individual locomotives within a consist as a function of one of the four recited operating modes (braking capacity, GPS determined position, a performance profile, or a location of a crew member,) are each independent of fuel efficiency, the resulting specified power levels will result in operating power levels that do not provide for optimized fuel efficiency as taught by Nickles '364. Moreover, the '280 patent does not disclose or suggest determining any of the four factors or specifying different power operating mode of individual locomotives in a consist.

As all of the aspects of claims 25-66 are not disclosed by and are not obvious in view of Nickles '364 and/or Nickles '280, Applicants submit that claims 25-66 are allowable over these references.

It is felt that a full and complete response has been made to the Office action and, as such, places the application in condition for allowance. Such allowance is hereby respectfully requested. If the Examiner feels, for any reason, that a personal interview will expedite the prosecution of this application, he is invited to telephone the undersigned.

Applicant does not believe that a fee is due. If, however, the Commissioner determines otherwise, such fees may be charged to Deposit Account No. 07-0846.

Respectfully submitted,

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